

US010767380B2

(12) **United States Patent**
Freeman et al.

(10) **Patent No.:** **US 10,767,380 B2**
(45) **Date of Patent:** ***Sep. 8, 2020**

(54) **CORE FORM DEVICE**

- (71) Applicant: **Cor-Form, LLC**, Meredith, NH (US)
- (72) Inventors: **Michael Freeman**, Woburn, MA (US);
John Hancock, Merrimack, NH (US)
- (73) Assignee: **Cor-Form, LLC**, Meredith, NH (US)
- (*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **15/702,973**

(22) Filed: **Sep. 13, 2017**

(65) **Prior Publication Data**

US 2018/0002937 A1 Jan. 4, 2018

Related U.S. Application Data

(63) Continuation of application No. 14/599,685, filed on Jan. 19, 2015, now Pat. No. 9,777,492.

(51) **Int. Cl.**
E04G 23/02 (2006.01)
E04G 15/06 (2006.01)

(52) **U.S. Cl.**
CPC **E04G 23/0203** (2013.01); **E04G 23/0288** (2013.01); **E04G 15/061** (2013.01); **E04G 15/068** (2013.01)

(58) **Field of Classification Search**
CPC ... E04C 2/52; E04G 23/0203; E04G 23/0285; E04G 23/0288; E04G 15/061; E04G 15/063; E04G 15/065; E04G 15/066; E04G 15/068

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

- 578,728 A * 3/1897 Doten E04B 1/2403 217/22
- 1,482,565 A * 2/1924 Johnson E04G 15/061 126/314
- 1,603,245 A * 10/1926 Pederson F16L 5/04 52/220.8
- 1,975,637 A * 10/1934 Finley E04B 1/86 181/288
- 2,593,456 A 4/1952 James
- 2,598,194 A 5/1952 Shippey
- 2,614,310 A 10/1952 James
- 2,637,462 A * 5/1953 Becker B65D 39/00 16/42 T
- 2,710,996 A 6/1955 Pittman
(Continued)

FOREIGN PATENT DOCUMENTS

- FR 2982297 A1 5/2013
- GB 2145793 A * 4/1985 F16B 13/066
(Continued)

OTHER PUBLICATIONS

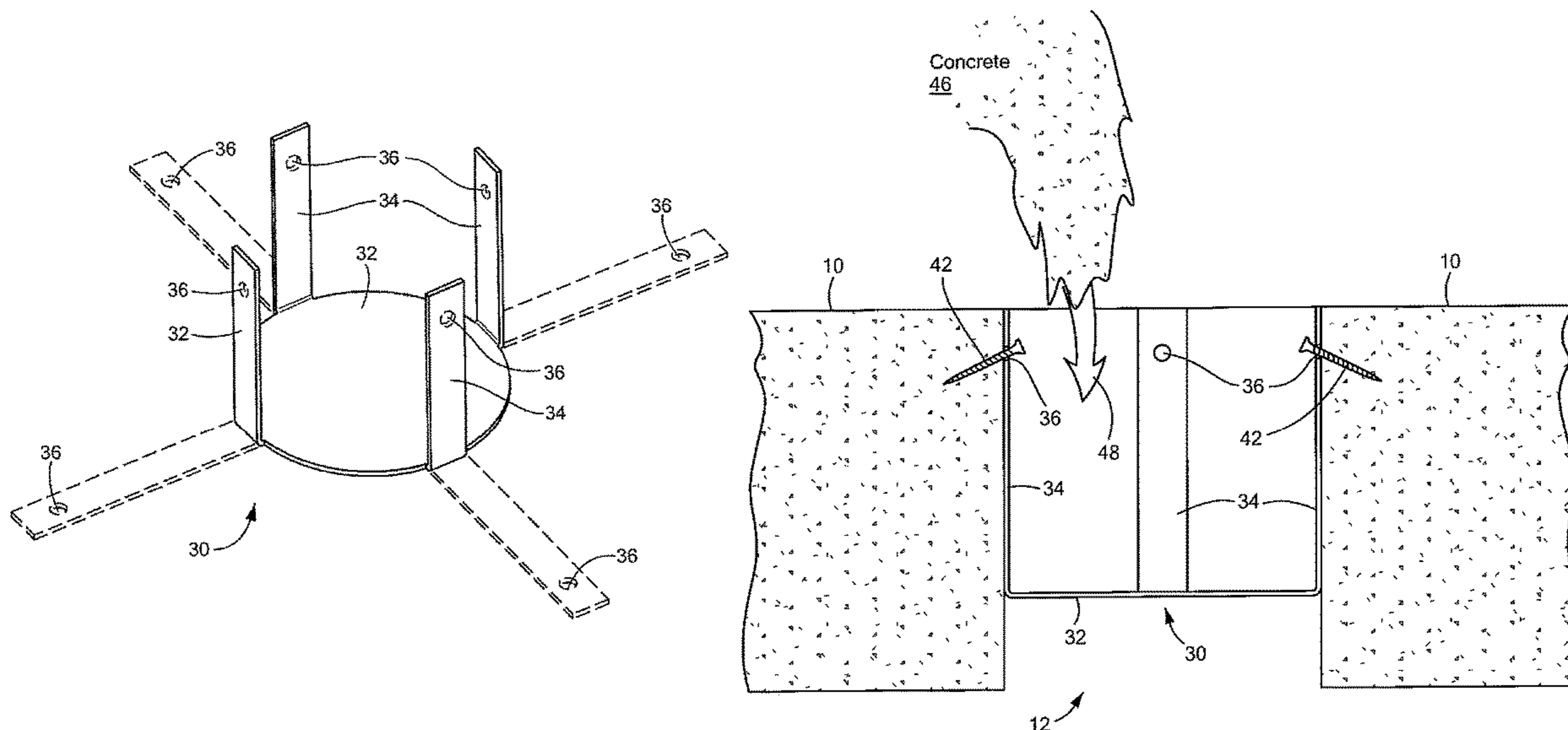
Kelly, Patrick J., "Practical Guide to 'Free-Energy' Devices", V. 26.2, Aug. 2014, pp. 1, 10-35 through 10-42.

Primary Examiner — Rodney Mintz
(74) *Attorney, Agent, or Firm* — Iandiorio Teska & Coleman, LLP

(57) **ABSTRACT**

A core form device including a circular plate and a plurality of bendable arms extending from the circular plate which when bent about the circular plate form the core form device.

18 Claims, 7 Drawing Sheets



(56)

References Cited

U.S. PATENT DOCUMENTS

3,196,581 A * 7/1965 Castelli E04G 21/22
52/125.3
3,265,349 A * 8/1966 Hamrick E04G 15/061
249/177
3,289,374 A 12/1966 Metz
3,295,285 A 1/1967 Metz
3,325,955 A 6/1967 Haut
3,413,772 A 12/1968 McCarthy
4,075,809 A 2/1978 Sirkin
4,077,599 A * 3/1978 Oland B28B 7/28
249/177
4,100,712 A 7/1978 Hyman
4,201,361 A 5/1980 Kung
4,445,304 A * 5/1984 Koda E04G 13/00
249/83
4,471,594 A 9/1984 Doyle
4,515,271 A * 5/1985 Auciello B28B 7/303
206/519
4,588,626 A 5/1986 Cologna et al.
4,820,564 A 4/1989 Cologna et al.
4,961,799 A 10/1990 Cologna et al.
5,018,331 A 5/1991 Forzano
5,033,949 A 7/1991 Jewett
5,034,254 A 7/1991 Cologna et al.
5,299,404 A 4/1994 Jabro
5,417,519 A 5/1995 Smuts
D367,596 S 3/1996 Russell
5,540,013 A 7/1996 Diamond
5,556,688 A 9/1996 Cox
5,778,624 A 7/1998 Russell
6,044,613 A 4/2000 Crafts et al.
6,070,373 A 6/2000 Diamond
6,378,263 B1 4/2002 Sobers
7,222,778 B2 * 5/2007 Smith B65D 5/5028
229/116.1
7,665,272 B2 2/2010 Reen
7,730,691 B2 6/2010 Patrick

7,827,759 B1 11/2010 Barnes
7,984,595 B2 7/2011 Reen
8,381,474 B2 2/2013 Lewis
8,615,949 B2 12/2013 Georgievski
8,661,758 B2 3/2014 Longhenry
8,978,341 B2 3/2015 Maanum et al.
9,540,839 B1 1/2017 Groww
9,777,492 B2 * 10/2017 Freeman E04G 23/0203
2004/0206806 A1 * 10/2004 Smith B65D 5/5028
229/116.1
2005/0204672 A1 9/2005 Hansen
2010/0115873 A1 * 5/2010 Reen E04G 23/0203
52/514
2011/0017730 A1 * 1/2011 Marquis-Martin H02G 3/121
220/3.9
2011/0262237 A1 * 10/2011 Baratta B23B 51/0473
408/204
2012/0066986 A1 * 3/2012 Dicleli E04H 9/021
52/167.1
2013/0112847 A1 * 5/2013 Pantano E04G 13/00
249/13
2013/0232895 A1 9/2013 Berset et al.
2013/0312354 A1 11/2013 Johnson et al.
2013/0312362 A1 11/2013 Maanum et al.
2014/0035181 A1 * 2/2014 Pantano E04G 13/062
264/35
2014/0112728 A1 * 4/2014 Baratta B23B 51/042
408/204
2014/0174024 A1 6/2014 Longhenry
2015/0315774 A1 * 11/2015 Agnone E04B 1/32
403/171
2016/0208505 A1 * 7/2016 Freeman E04G 23/0203
2016/0208506 A1 7/2016 Butler
2020/0165831 A1 * 5/2020 Barmettler E04G 23/0203

FOREIGN PATENT DOCUMENTS

GB 2362195 A 11/2001
WO WO 2012005598 A1 2/2012

* cited by examiner

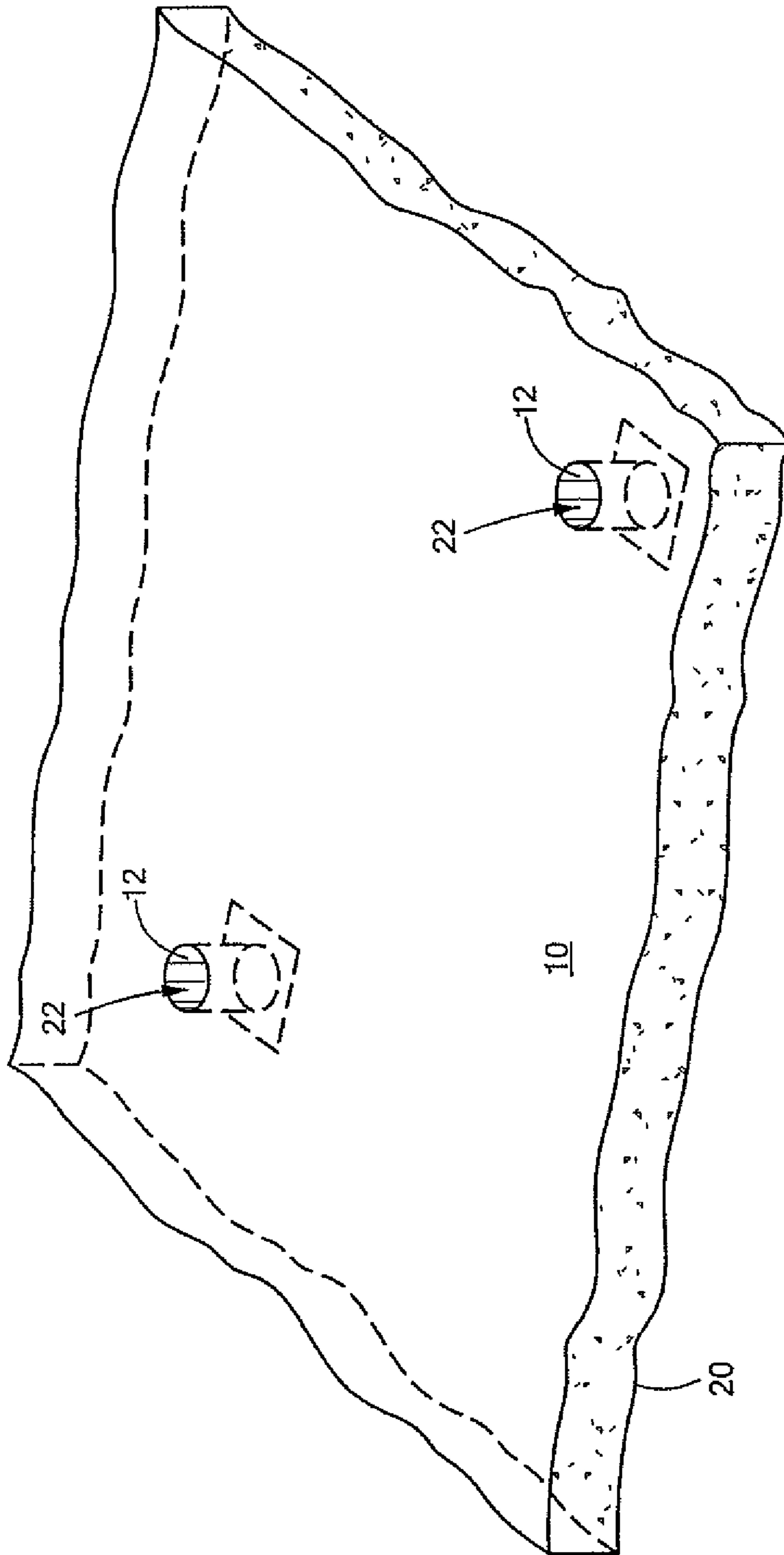


FIG. 1
(PRIOR ART)

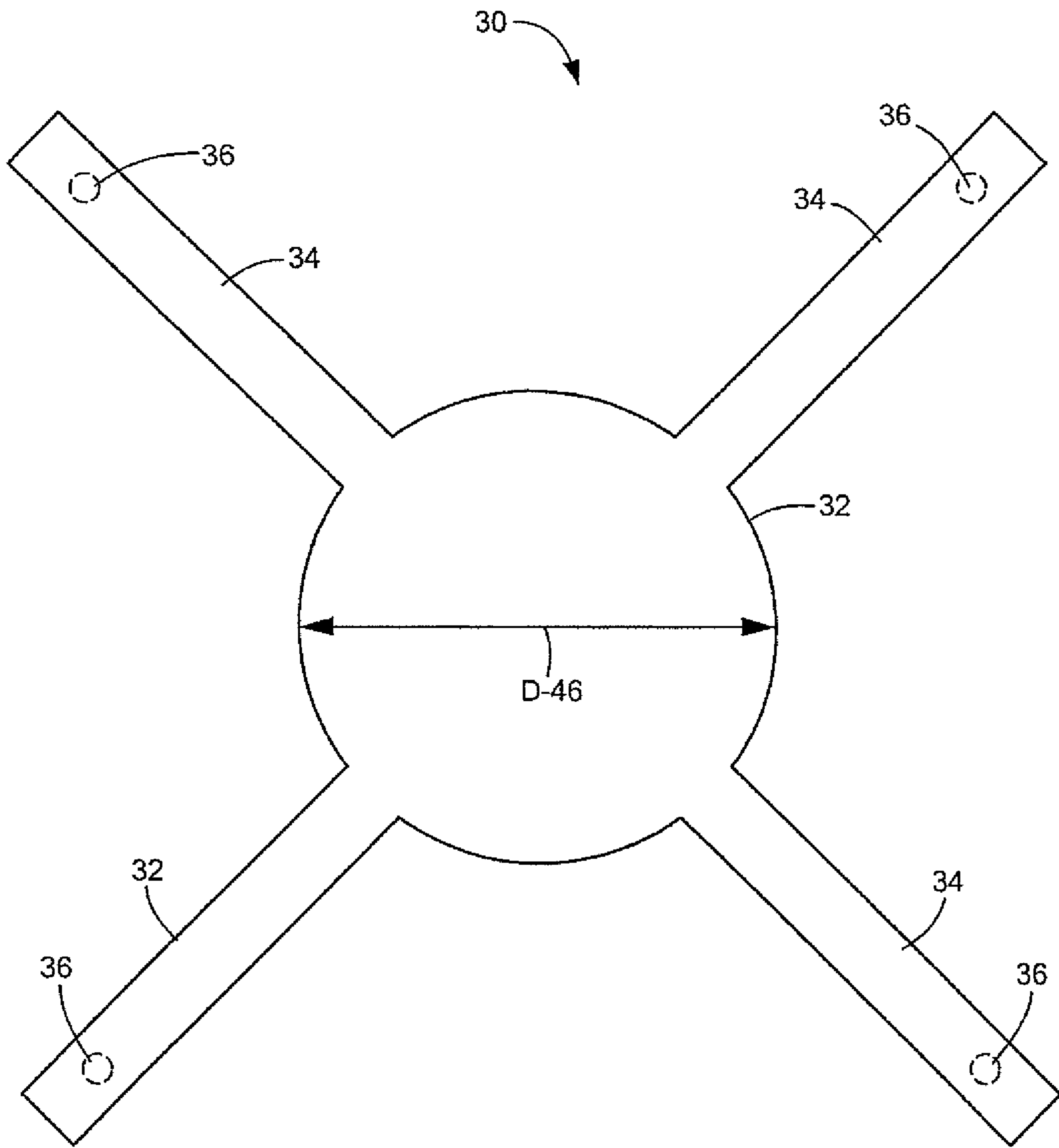


FIG. 2

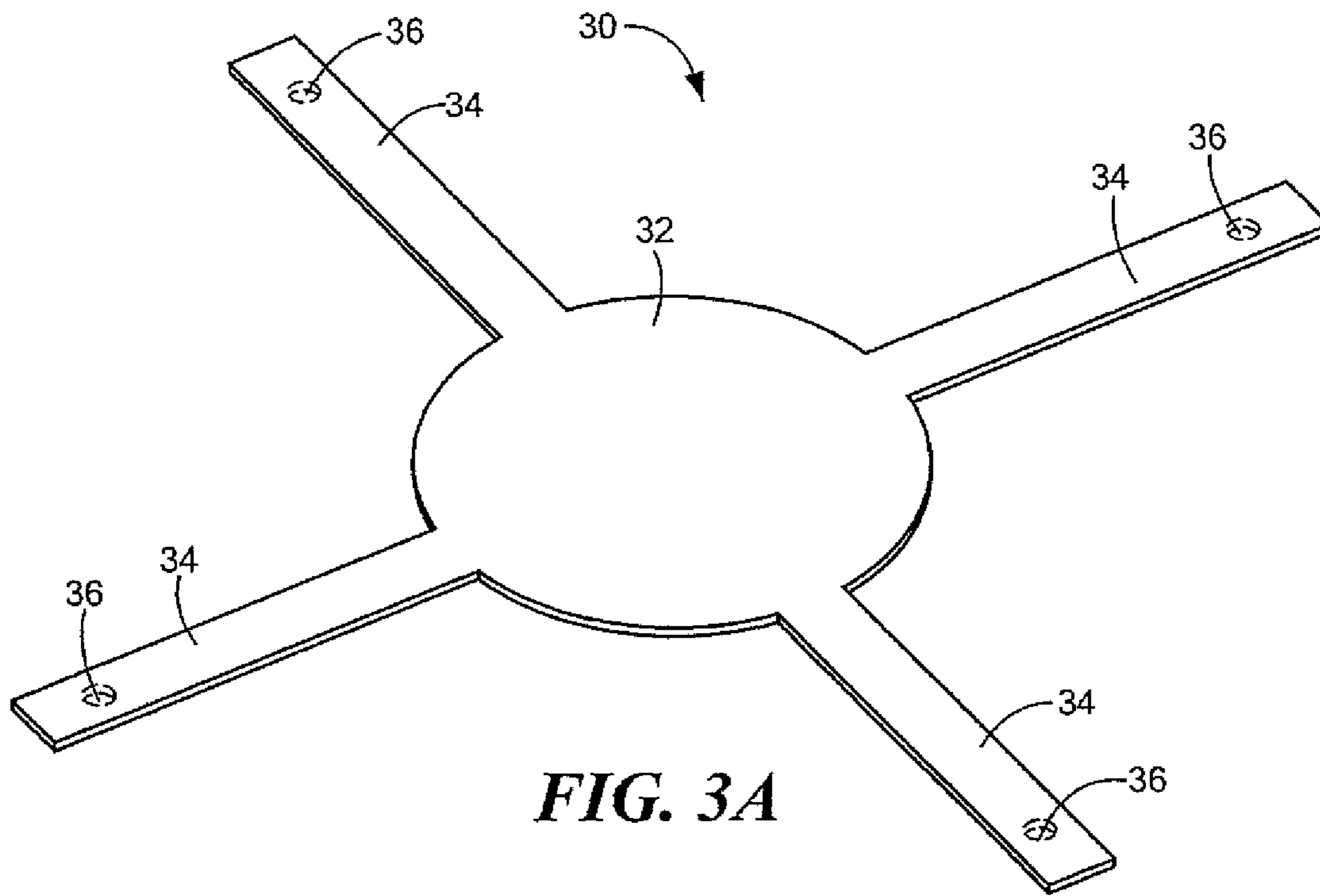


FIG. 3A

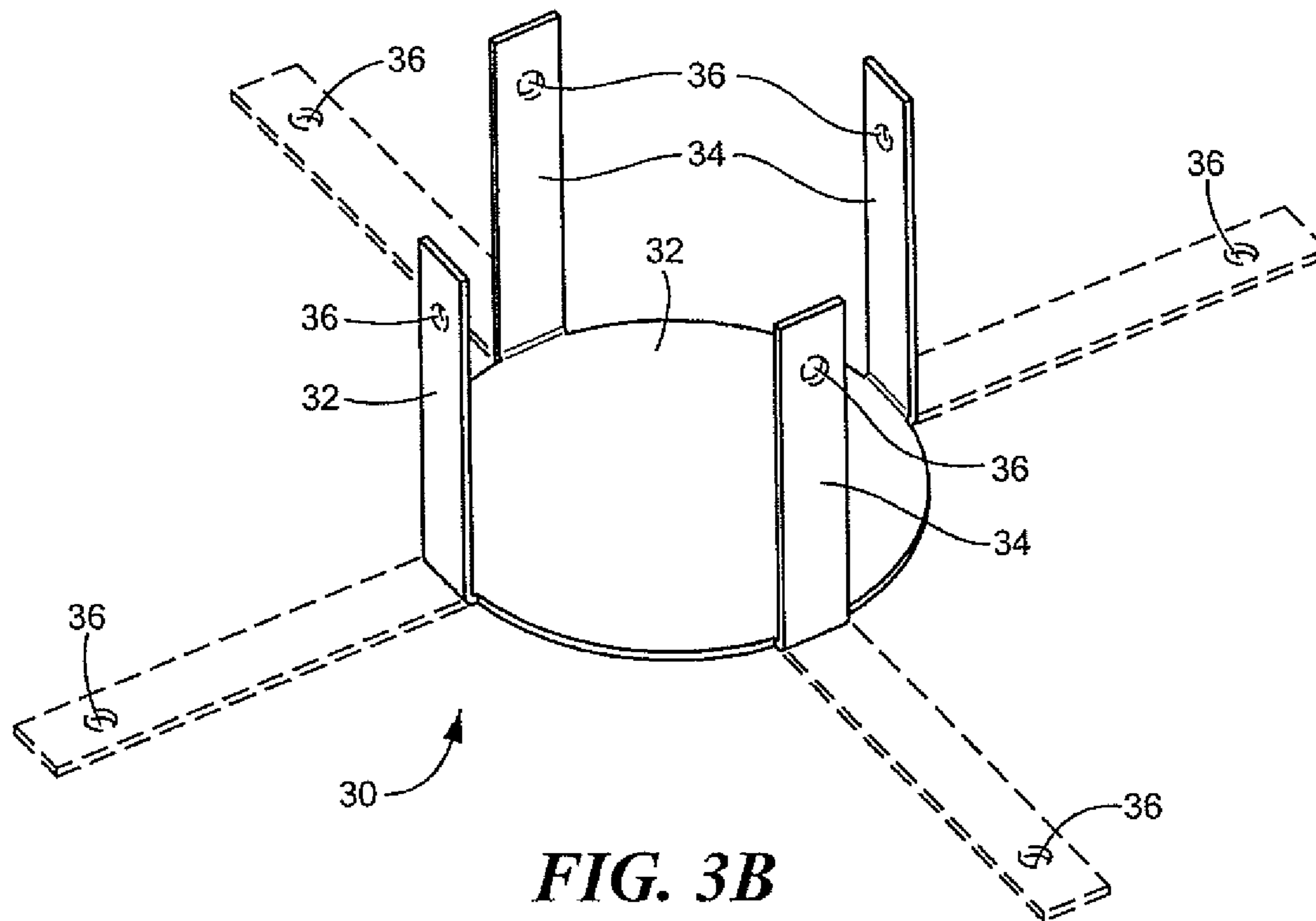
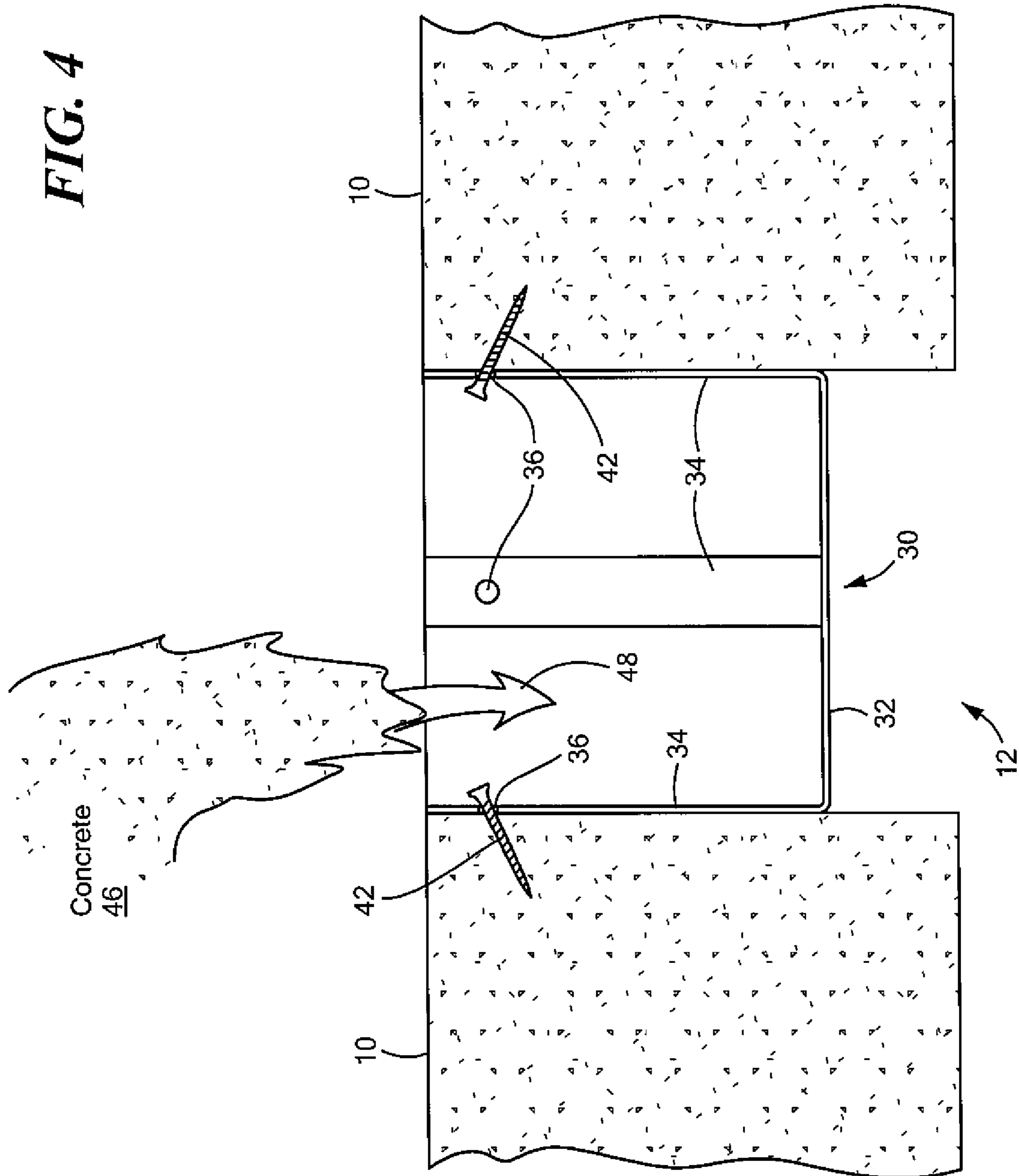


FIG. 3B

FIG. 4



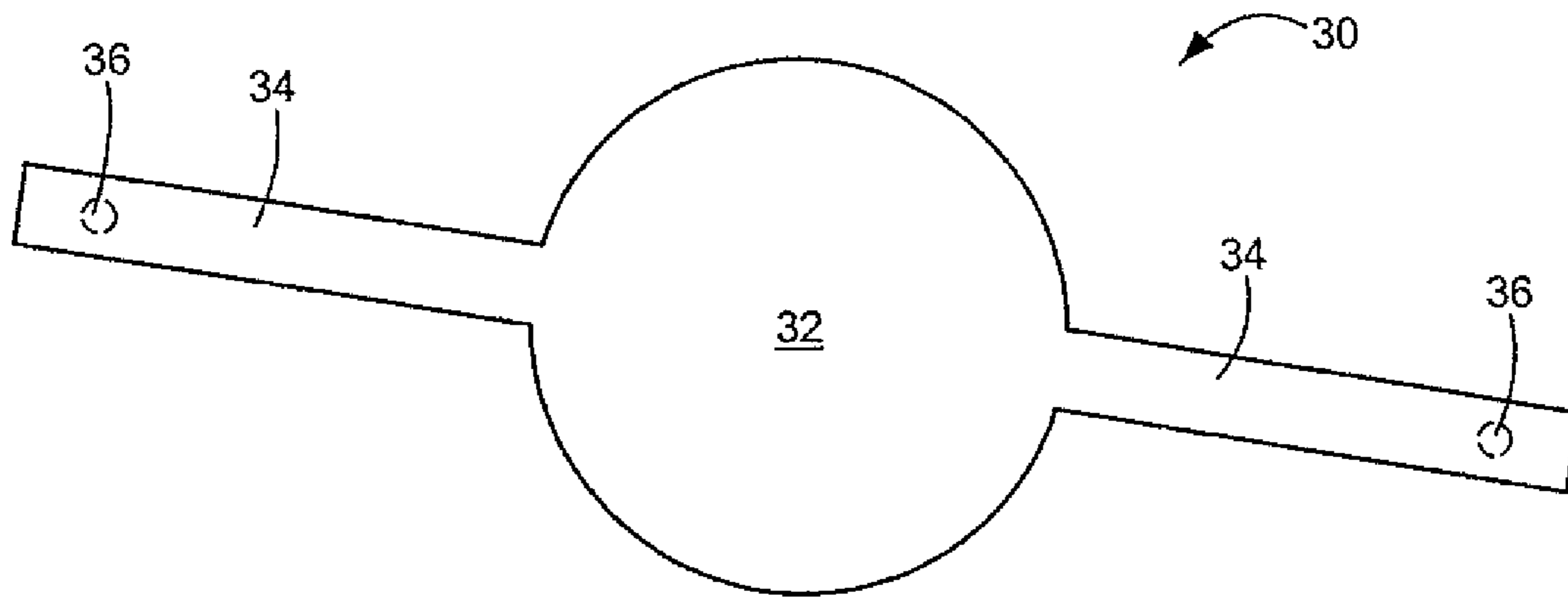


FIG. 5

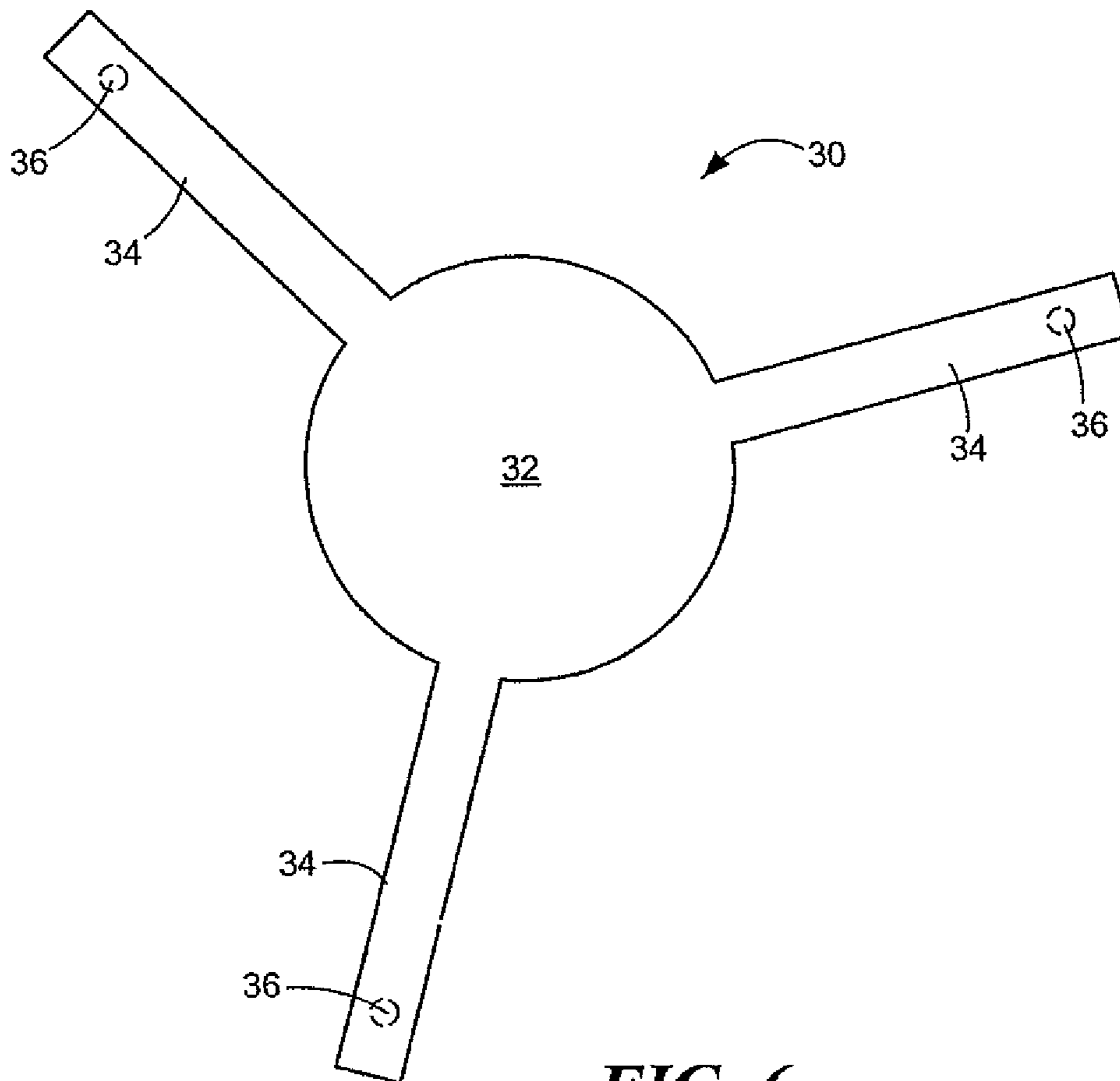


FIG. 6

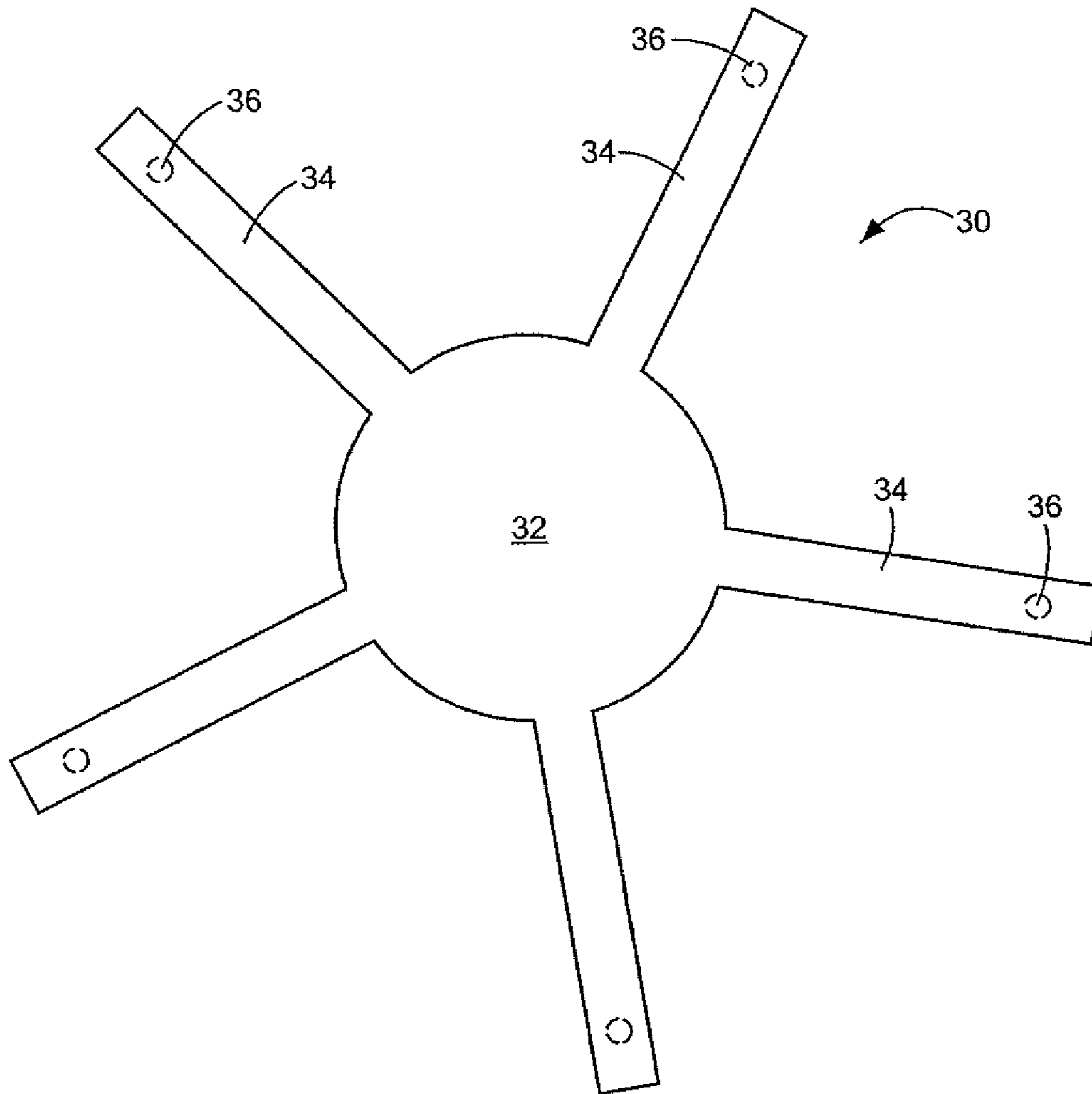


FIG. 7

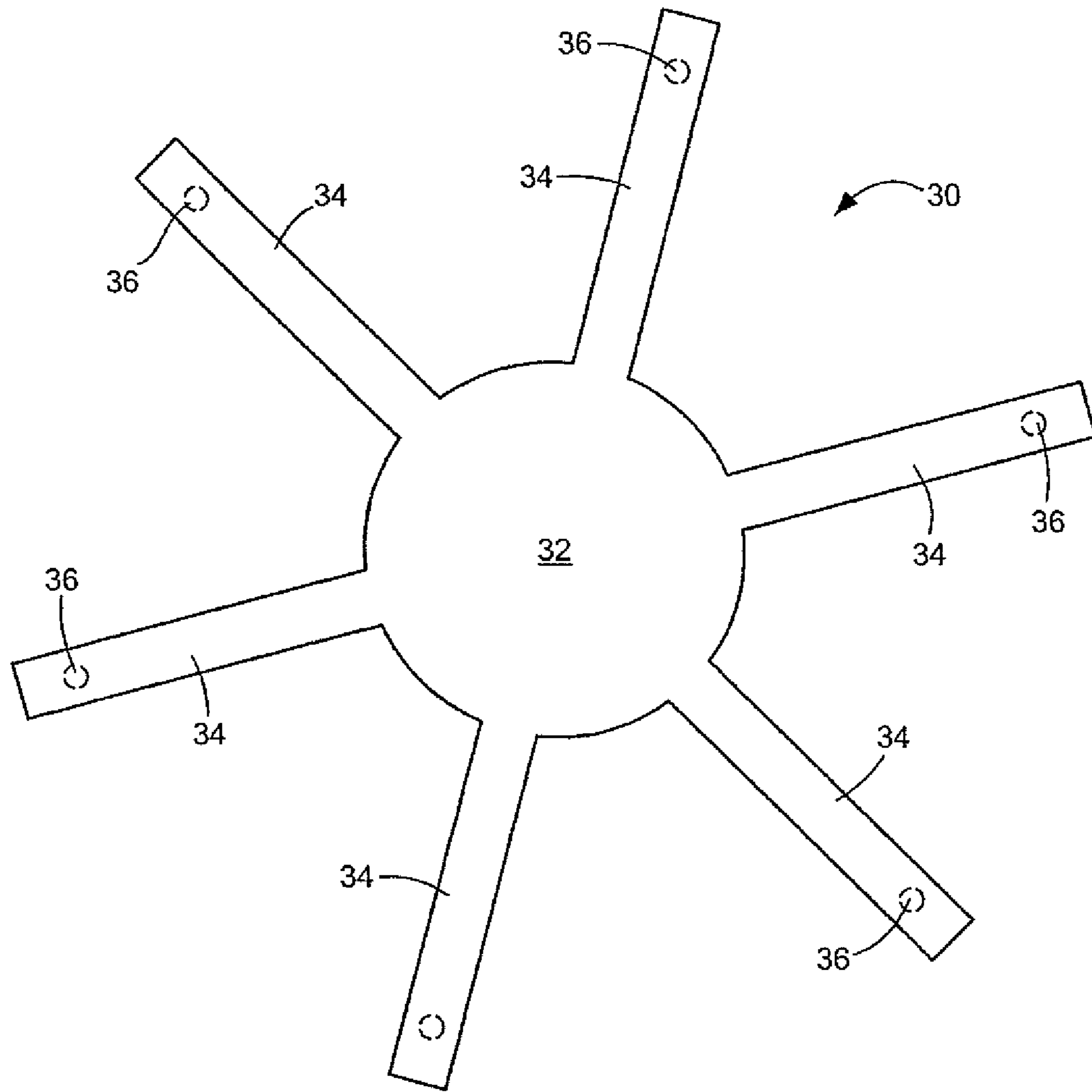


FIG. 8

1**CORE FORM DEVICE**

RELATED APPLICATIONS

This application is a continuation of U.S. Patent application Ser. No. 14/599,685, filed on Jan. 19, 2015, which hereby claims the benefit of and priority thereto under 35 U.S.C. §§ 119, 120, 363, 365, and 37 C.F.R. § 1.55 and § 1.78, and which is incorporated herein by reference.

FIELD OF THE INVENTION

This invention relates to a core form device.

BACKGROUND OF THE INVENTION

When renovation is conducted on existing structures, the electrical and plumbing conduits which go through the concrete slab or floor are often removed. This may result in core holes being left in the concrete slab or floor.

Conventional techniques to fill core holes include creating a concrete form by securing plates to the bottom of the core holes and then pouring concrete into the constructed form. The problem with such a technique is that the plates must be secured to the bottom of the concrete floor or slab which is located on the floor below. This may require an extensive effort and expense to move and cover furniture and the like if the space below is occupied.

Thus, there is a need to efficiently and effectively fill core holes in a simple and efficient manner.

BRIEF SUMMARY OF THE INVENTION

This invention features a core form device including a circular plate and a plurality of bendable arms extending from the circular plate which when bent about the circular plate form a core form.

In one embodiment, the core form may be configured to be inserted into a core hole in a concrete slab. The concrete slab may include a concrete floor. The one or more of the arms may include an opening for receiving a fastener used to secure the core form device to a concrete slab. The circular plate and the bendable arms may be made of a metal material, an alloy material, or plastic. The plurality of arms may include six arms, five arms, four arms, three arms, or two arms. The diameter of the circular plate may be less than the diameter of the core hole.

This invention also features a method for filling a core hole in a concrete slab. The method includes providing a circular plate including a plurality of bendable arms extending from the circular plate, bending the arms about the circular plate to form a core form for filling the core hole in a concrete slab, inserting the core form into the core hole in the concrete slab, and pouring concrete into the core form to repair the core hole.

In one embodiment, the concrete slab may include a concrete floor. The circular plate may include providing the circular plate with a diameter less than the diameter of the core hole.

This invention also features a method for manufacturing a core form device. The method includes providing a circular plate including a plurality of bendable arms which extend from the circular plate and bending the arms about the circular plate to form a core form for filling core holes in a concrete slab.

In one embodiment, the method may include providing an opening in one or more of the arms for receiving a fastener.

2

The circular plate may include providing the circular plate with a diameter less than the diameter of the core hole.

The subject invention, however, in other embodiments, need not achieve all these objectives and the claims hereof should not be limited to structures or methods capable of achieving these objectives.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

Other objects, features and advantages will occur to those skilled in the art from the following description of a preferred embodiment and the accompanying drawings, in which:

FIG. 1 is a three-dimensional view of a typical concrete slab or floor with core holes being repaired using conventional techniques;

FIG. 2 is a schematic top-view of one embodiment of the core form device of this invention;

FIGS. 3A-3B are three-dimensional views showing an example of the arms being bent about the circular plate of the core form device shown in FIG. 1;

FIG. 4 is a schematic side-view showing the core form device shown in FIGS. 2-3 used to repair a core hole;

FIG. 5 is a schematic top-view of another embodiment of the core form device of this invention including two arms extending from the circular plate;

FIG. 6 is a schematic top-view of another embodiment of the core form device of this invention including three arms extending from the circular plate;

FIG. 7 is a schematic top-view of yet another embodiment of the core form device of this invention including five arms extending from the circular plate; and

FIG. 8 is a schematic top-view of another embodiment of the core form device of this invention including six arms extending from the circular plate.

DETAILED DESCRIPTION OF THE INVENTION

Aside from the preferred embodiment or embodiments disclosed below, this invention is capable of other embodiments and of being practiced or being carried out in various ways. Thus, it is to be understood that the invention is not limited in its application to the details of construction and the arrangements of components set forth in the following description or illustrated in the drawings. If only one embodiment is described herein, the claims hereof are not to be limited to that embodiment. Moreover, the claims hereof are not to be read restrictively unless there is clear and convincing evidence manifesting a certain exclusion, restriction, or disclaimer.

As discussed in the Background section, when renovation is conducted on existing structures, the electrical and plumbing conduits which go through the concrete floor are often removed. The result is core holes may be left in the concrete slab or floor. For example, FIG. 1 shows an example of concrete slab or floor 10 wherein core holes 12 and 14 are created during a renovation process.

Conventional techniques to fill core holes 12 and 14 may include creating concrete forms by securing plates 16, 18 to bottom of core holes 12 and 14, respectively, on bottom surface 20 of floor or slab 10. Concrete is then poured into the constructed forms, as indicated by arrows 22 to repair the core holes.

The problem with such a technique is that plates 16 and 18 must be attached to bottom surface 20 of floor or slab 10

which is located on the floor below. This requires an extensive effort if the space occupied below floor or slab 10 is occupied.

There is shown in FIG. 2, one embodiment of core form device 30 of this invention. Device 30 includes circular plate 32 and a plurality of bendable arms 34 extending from plate 32 as shown. In this example, core form device includes four arms 34 extending from plate 32 for use with a typical core hole having a diameter in the range of about 2 inches to about 20+ inches. Preferably, arms 34 each include orifice or opening 36 for receiving a concrete fastener. In another design, one or more of arms 34 may not necessarily include opening 36. In this design, a hole may be drilled in one or more of arms 34 as needed.

Circular plate 32 may be manufactured in various diameters to accommodate core holes of various sizes. In one example, diameter d-46 of circular plate 32 is in the range of about 2 inches to about 12 inches. In one preferred design, diameter d-40 of circular plate is about 3¼ inches, e.g., about ¼ inch less than the size of a typical core hole for easy installation. In another example, diameter d-40 of circular plate 32 may be only about ⅛ inch less than the diameter of the core hole for easy installation.

Arms 34 of core form device 30, FIGS. 2 and 3A, where like parts have been given like numbers, are bent as shown in FIG. 3B to form core form 40 which fits inside a core hole, e.g., core hole 12, FIG. 4, having a diameter of about 3½ inches. In one example, when the walls of the core hole are straight, arms 34, FIG. 3B, are bent about 90° as shown. In other examples, arms 34 may be bent at a slight angle to accommodate core holes with slanted walls. Core form 40 is then inserted into core hole in a concrete slab or floor, e.g., core hole 12, FIG. 4, as shown. Fasteners 42, e.g., concrete fasteners, may then be driven through openings 36 in one or more of arms 34 through arms 34 or holes may be drilled into arms 34 which do not have an opening therein. Core form 44 is then filled with concrete 46, indicated by arrow 48 to efficiently fill core hole 12.

For smaller core holes, e.g., core holes having a diameter of about 2 inches, core form device 30, FIGS. 2-4, may only include two arms 34, e.g., as shown in FIG. 5 or three arms extending from circular plate 32, e.g., as shown in FIG. 6. For larger core holes, e.g., core holes having a diameter greater than about 10 inches, core form device 30, FIG. 7, may include five bendable arms 34 extending from circular plate 32 or six bendable arms 34 extending from circular plate 32 as shown in FIG. 8. In other examples, core form device may include more than six arms depending on the size of the core hole, e.g., seven, eight, or more bendable arms 34 extending from circular plate 32, as known by those skilled in the art.

In one example, core form device 30 may be made of 16-20 gauge sheet metal, strong plastic material, or similar type material. In other examples, core form device 30 may be made of an alloy material.

In one example, the length of arms 34 is in the range of 2 inches to about 12 inches, e.g., about 4 inches to about 5 inches which is the standard thickness of a typical concrete floor or slab. Preferably, holes 36 in one or more of arms 34 are between ⅛th of an inch and ⅜th of an inch in diameter to allow for the use of standard concrete anchors to be utilized.

The result is core form device 30 effectively and efficiently fills core holes, e.g., core hole 12, FIG. 4, without the need to utilize plates 16 or 18, FIG. 1, on bottom surface 20 of concrete floor 10. Therefore no entry is required to the

floor space below floor 12. Thus, core form device 30, FIG. 1, can save significant expense during a renovation project.

Although specific features of the invention are shown in some drawings and not in others, this is for convenience only as each feature may be combined with any or all of the other features in accordance with the invention. The words “including”, “comprising”, “having”, and “with” as used herein are to be interpreted broadly and comprehensively and are not limited to any physical interconnection. Moreover, any embodiments disclosed in the subject application are not to be taken as the only possible embodiments.

In addition, any amendment presented during the prosecution of the patent application for this patent is not a disclaimer of any claim element presented in the application as filed: those skilled in the art cannot reasonably be expected to draft a claim that would literally encompass all possible equivalents, many equivalents will be unforeseeable at the time of the amendment and are beyond a fair interpretation of what is to be surrendered (if anything), the rationale underlying the amendment may bear no more than a tangential relation to many equivalents, and/or there are many other reasons the applicant can not be expected to describe certain insubstantial substitutes for any claim element amended.

Other embodiments will occur to those skilled in the art and are within the following claims.

What is claimed is:

1. A core form device comprising:

a core form having a completely solid circular plate and a plurality of discrete bendable arms extending therefrom;

wherein the bendable arms are positioned around and extend from an outer perimeter edge of the circular plate, the bendable arms remain bent straight in a bent configuration to form the core form;

wherein the core form is a unitary structure of one-piece construction composed of a single piece of material; and

wherein the core form is configured to be inserted into a core hole located in a concrete slab or a concrete floor and permanently secured thereto.

2. The core form device of claim 1 further including at least one aperture located in one of the plurality of bendable arms, the at least one aperture configured to receive a fastener that permanently secures the core form in the core hole located in the concrete slab or the concrete floor.

3. The core form device of claim 1 further including a fastener configured to permanently secure the core form device to the concrete slab or the concrete floor.

4. The core form device of claim 1 in which the circular plate and the bendable arms are made of an alloy material.

5. The core form device of claim 1 in which the circular plate and the bendable arms are made of an alloy material.

6. The core form device of claim 1 in which the circular plate and the bendable arms are made of plastic.

7. The core form device of claim 1 in which the plurality of arms includes six arms.

8. The core form device of claim 1 in which the plurality of arms includes five arms.

9. The core form device of claim 1 in which the plurality of arms includes four arms.

10. The core form device of claim 1 in which the plurality of arms includes three arms.

11. The core form device of claim 1 in which the plurality of arms includes two arms.

12. The core form device of claim 1 in which a diameter of the circular plate is less than a diameter of the core hole.

13. A method for filling a core hole in a concrete slab, the method comprising:

providing the core form device of claim 1;

bending the arms about the outer perimeter edge of the circular plate to form the core form for filling the core hole in the concrete slab;

inserting the core form into the core hole in the concrete slab; and

pouring concrete into the core form to repair the core hole.

14. The method of claim 13 in which the concrete slab includes a concrete floor.

15. The method of claim 13 in which the circular plate has a diameter less than a diameter of the core hole.

16. The method of claim 15 further including providing an opening in one or more of the arms for receiving a fastener.

17. A method for manufacturing a core form device, the method comprising:

providing the core form device of claim 1; and

bending the arms about the outer perimeter edge of the circular plate to form the core form for filling core holes in the concrete slab.

18. The method of claim 17 in which the circular plate has a diameter less than a diameter of the core hole.

* * * * *